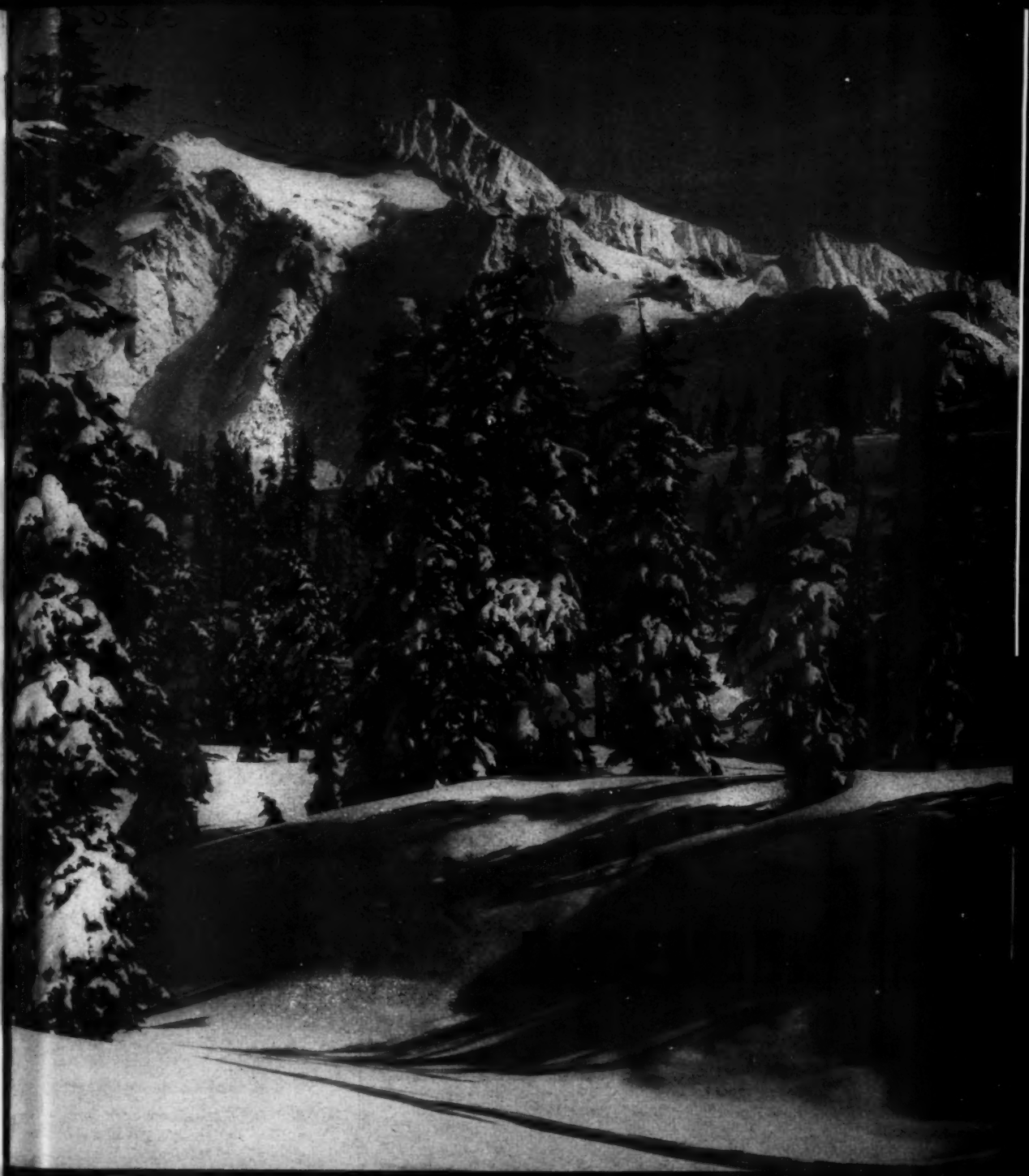

SOIL CONSERVATION

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★ THIS MONTH ★

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TOM DALE, Editor

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication has been approved by the Bureau of the Budget, June 26, 1958. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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"Yes, Virginia, there is a Santa Claus." He has many helpers . . . many assistant Santa Clauses.

The most generous Santa Claus in the world is the soil.

The soil gives us food, much of our clothing and houses and furniture, beautiful lawns, gardens and parks, and forests. It cradles the ponds and streams in which we swim, boat, and fish. It stores water we use in so many ways.

What would Christmas be without a little greenery, a bit of the outdoors, brought inside? The traditional Christmas tree, holly, or other symbols of life and cheer? Again we enjoy the bounty of the soil.

And what does the soil ask in return? How can we be "good children" to this Santa Claus?

All we need to do is keep the soil secure and in place . . . use it within its capability, treat it according to its needs, and protect it while we use it.

Yes, Virginia, there is a Santa Claus. It is the soil.

Merry Christmas.

FRONT COVER.—Snow surveyors who travel the snow survey course in the vicinity of 10,750-foot Mount Baker, Wash., have their own natural Christmas trees.

—Photo by Byron Moser

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Conservation plays a part in spreading

Christmas Cheer

By LESTER FOX

Each Christmas soil and water conservation helps bring a gala package of colorful holly sprigs from Millville, N. J., to a lot of people throughout the United States.

The holly is grown in a large orchard conceived and maintained by Clarence R. Wolf, founder and the first long-time president of the Holly Society of America, Inc. In operation of the orchard, soil and water conservation plays a major part. Without it there would be little quality holly.

Wolf started a silica sand company in 1921 when he was principal of the Millville High School. Grateful for the patronage that he quickly built up, he started sending a Christmas remembrance to his customers as a token of appreciation. But he wanted something distinctive and especially something that would convey the true Christmas spirit. He had observed the holly trees growing wild in the woodland adjoining his plant, and noticed his workers cutting sprigs to take home at Chrstmas time. Symbol of hope and joy, holly was just the thing, he concluded.

So in 1926 Wolf sent 46 boxes of holly sprigs to industrial clients. The response was overwhelming. Nearly everyone went to the trouble of writing Wolf to tell him of the pleasure the holly had brought. Some hinted broadly that they would like nothing better than a similar package the next Christmas.

Since then the number of packages has increased to 2,200 boxes a year. Each package contains 25 holly sprigs and a boutonniere. The 2,200 boxes represent about 17,600 pounds of holly.

It wasn't long before the native woodland was hard pressed to produce enough quality holly to meet the demand. So in 1939 Wolf started his holly orchard. Workers at the sand plant, most of whom are farmers because of Wolf's preference, set out 40 acres of seedlings from the woodland and a few bought from nurseries. Six years ago Wolf put out 1,600 new trees of improved species and varieties developed by Daniel G. Fenton. They cover 18

Note:—The author is information specialist, Soil Conservation Service, Upper Darby, Pa.

Miss Betty Jane Peterson cuts sprigs of red-berried holly in Clarence R. Wolf orchard.

acres. The orchard had become so big and was so much in need of continuous attention that Fenton was employed as manager in 1945. He has a year-round staff of three men and calls on plant workers when he needs more help.

Fenton quickly saw the need of a soil and water conservation program to prevent erosion of the Galestown sand and the Pocomoke sandy loam soils of the orchard. It was needed to get top production of quality holly.

The conservation program consists of many dove-tailing practices. Fenton keeps the soil covered with ryegrass and ladino clover to prevent wind and water erosion. He's looking for a clover that can take heavy traffic. When he mows the clover, he leaves the clippings to add organic matter to the soil. A tile drainage system keeps excess water off the land. Mulching, pruning, and fertilizing lightly with chicken manure and 500 pounds of 5–10–5 an acre each spring are a part of the conservation plan.

Fenton irrigates young trees until they are 3 years old. While the holly trees have not been affected by disease, they do fall prey to insects. So Fenton sprays them regularly.

When Fenton put out the new 18-acre orchard 6 years ago, he was careful to preserve soil values. In clearing scrub oaks and pines, he used a bulldozer with a front rake. The rake cleared the trees without covering or removing the topsoil. He then planted soil-improving rye and ryegrass. In the spring he turned the crop under, manured the soil heavily, cultivated, and planted holly trees. Then he seeded a cover crop.

With this kind of conservative care, the orchard is a high producer.

It's not uncommon to cut from 70 to 80 pounds of holly sprigs from one tree after it gets to be 15 years old," Fenton said.

It would seem like an expensive proposition to maintain a holly orchard just to provide Christmas cheer. But Wolf says: "You can't put a price on goodwill." He agrees that you can't put a price on soil and water conservation either.

Below: Orchard Manager Daniel G. Fenton (left) and SCS Technician James S. Wasson discuss ground cover in holly orchard. Left: One of three revolving wind towers which help prevent frost damage.

Merry Christmas—Year-round Job

Christmas trees important part of Ohio farmer's conservation program

By LEO CLARK

Planting a quarter million trees in 10 years is a big job on any farm. That is what Roy Masterson of Sayre, Ohio, has done and he is continuing to plant about 25,000 a year. He likes Christmas trees, found them the solution to his erosion problem, and has developed a good woodland business.

Masterson, full-time farmer and past member of the Perry Soil Conservation District board of supervisors, operates more than a thousand acres in Perry and Morgan Counties.

This large operation didn't come about overnight. It started in 1946 when Masterson determined to do something about the eroded hillsides about him.

"I became interested in the woodland program because of the Soil Conservation Service technicians and our county Extension agent," Masterson said. "The SCS men pointed out that trees were the best use for these eroded upland acid soils."

Masterson became a cooperator with the Perry Soil Conservation District in 1946. The district sent an SCS technician to help him develop a complete farm plan. As he purchased new land he has revised the plan. Poplar, yellow locust, walnut, ash, and mixed pines were planted the first few years. Today, some of the best species of hardwoods and pines are in evidence in his plantations.

Masterson also gave attention to ponds and wildlife plantings. He has planted more than 100 rods of multiflora rose fence and built four farm ponds. He plans to build another one as soon as he can locate suitable sites in the proper places.

In addition to the tree business, Masterson has a fourth of his land in rotation crops with a livestock program which helps improve the soil fertility.

Masterson accomplished his tree planting program with the help of mechanical tree planters and a tractor. Last year he planted 50,000 trees.

Trees being his "first love," Masterson spends a lot of time following the tree planter in the spring, frequently tramping around the trees and pulling them up a little so the roots won't be crowded or bent. Over the past 10 years, survival has been 90 percent or better.

Note:—The author is soil conservation aid, Soil Conservation Service, Somerset, Ohio.

Tractor-drawn planting machine enabled Roy Masterson to plant a quarter million trees in 10 years.

Roy Masterson prunes some of his white pine to develop better shaped Christmas trees.

Masterson has developed both a retail and wholesale market for Christmas trees. He operates three large Christmas tree lots in Columbus, Ohio, and sells thousands on the stump. He supervises any cutting done on the farm so that a good timber stand will remain. He markets pulpwood during the winter.

Masterson is following a good conservation program on all his woodland fields. Improvement cuttings used for pulpwood and Christmas trees, provide some income each year.

"It is extremely important," Masterson said, "to have good roadways through the pine plantations. These serve as firebreaks and let firetrucks and spray equipment into the area. They also provide a way to haul out timber products. We spray for European pine shoot moth and tip moth repeating the treatment when new infestion is noticed."

Certain species of Scotch pines have a yellowish cast, making them unsuitable for Christmas trees. So attention is given to purchasing the proper strain in order to get the true green color and insure a saleable tree.

Masterson clears brush and sprays stumps with brush killer a year before he starts planting trees. Grass and small brush must be controlled where it is a problem. This is done with a rotary mower several times during the growing season. Many trees to be harvested for Christmas sales are shaped and pruned in late May or early June. Some of them can be sold that year but others need shaping the following year.

"It pays to keep the cost of machinery and labor in the woodland as low as possible to insure a yearly net income," he said. "But foresters and farmers working with trees are well aware that there is more in life than dollars and cents."

His good woodland management caused Robert Paton, forester with the Ohio Forestry Association to recommend the Masterson farm for recognition as an Ohio Tree Farm in 1957. In making this award to Masterson, William Laybourne, secretary-manager of the association, said: "This farm is one of the best examples of woodland management in Ohio."

Masterson is a charter member of the Ohio Christmas Tree Growers Association. His farm, in the past years, has been the scene of many forestry days and educational tours for both high school and adult groups.

Farmers, hunters, land, and wildlife all benefit from

Farming for Waterfowl

Significant progress in improving private lands for waterfowl in the Southeast and Pacific Coast States promises more wintering habitat for ducks, geese, and other water birds, improved facilities to meet increased hunter's demands, and an economic return to farmers and ranchers.

Farming for waterfowl—a new term describing modern farm technologies used in the development and management of tillable lands for annual production of a dependable, high-quality food crop for waterfowl—is replacing the hit or miss methods often used in the past. The new techniques include careful site selection, use of adapted plant species, seedbed preparation, proper seeding, and fertilization, as well as irrigation, improved drainage, and other methods of water-level control.

Such work usually is on diked areas where food plants include barnyardgrass, common sudangrass, browntopmillet, and smartweeds. Where field corn may be grown, it often is used on higher capability lands. Farmers flood these areas in fall and winter by pumping, stream or reservoir diversion, or seasonal rains, making seed of the planted grasses available to the waterfowl. Some farming for waterfowl in soil conservation districts is on privately-owned or leased lands of organized duck clubs.

California alone has more than 800 clubs controlling 200,000 acres of land operated primarily for waterfowl shooting, but where livestock production or another farm enterprise may be a secondary land use.

Agencies team up to help ranchers get

Good Grass

By **HERB BODDY**

GOOD grass growth that C. O. Bankhead and son Armand got by whipping a tough alkali condition on their wet lands near Bethany in San Joaquin County, Calif., shows what farmers can gain by giving today's tested soil and water conservation tools a trial.

The Bankheads' success in getting grass to grow on alkaline, salty acres called for giving their land the full conservation treatment, including drainage, land leveling, relocation of irrigation borders, and reseeding to improved grasses and legumes plus proper grazing use.

All this work was carried out with help from Soil Conservation Service technicians, Agricultural Research Service specialists, and the Agricultural Conservation Program through the Eastern Alameda County Soil Conservation District. The work paid off well. Grass was more than doubled on the worst alkali areas. On other treated acres growth was high and lush the first year.

Several years ago the Bankheads looked around for an irrigated ranch to go with their hill ranches in the production of hay, grain, and livestock. Because of the reasonable cost of water and land, they chose the 450-acre Bethany place close to their hill holdings.

Says Armand Bankhead, "The new ranch met our needs, but it had some tough soil and water problems. Our land lay behind dikes along the San Joaquin River and there was no outlet for drainage water. The situation resulted in a high water table and concentration of salts and alkali on portions of the ranch lands."

There was a lot of alkali on 200 acres and the rest of the land was fairly salty. Irrigation runoff and subsurface drainage from higher areas gave the farm a high water table.

Arthur Carns of the Livermore Soil Conservation Service office, who helped the Bankheads work out things with help from the Agricultural Research Service and Agricultural Conservation Program, tells how the water and grass problems were whipped.

Says Carns, "We work with a good many farmers in Alameda and San Joaquin Counties who have alkali and water troubles like the Bankheads. There's a lot of subsurface water seeping into valley lands from the hills. You have to drain this water if you want to make a go of farming.

"When we checked the drainage system we found a ¾-mile long ditch on the north side of the farm, which was far too shallow.

Note:—The author is information specialist, Soil Conservation Service, Berkeley, Calif.

One of main ditches that carries excess water to sump on Bankhead ranch.

Armand Bankhead (right) and A. G. Carns inspect sump used to pump water over levee into San Joaquin River.

C. O. Bankhead (left) and Armand Bankhead check their conservation ranch plan with SCS Technician A. G. Carns (center) in newly established pasture.

"We helped the Bankheads stake a total of 15,000 feet of new ditches and enlarge 8,000 feet of old ditches. The improved ditches are 20 feet across the top, 4 feet wide at the bottom, and have an average depth of 7 feet.

"These main disposal ditches were installed over a 3-year period with dragline equipment at a cost of $6,000, about half of which was refunded under the ACP cost-sharing program.

"The job of these disposal ditches is to carry water to a sump where it can be pumped over the dike to the San Joaquin River."

Field investigations carried out under Dean C. Muckel of ARS tie in with technical assistance given the Bankheads by SCS. ARS installed a water-stage recorder and flume to measure water in one of the ditches. ARS specialists take periodic water samples at the flume and from auger borings in irrigated fields. Soil samples also are taken in fields and a close check is kept on salt content.

The measuring flume shows that water drained from about 90 acres at the start of the irrigation season (1958 had an abnormally wet winter) amounted to 200 gallons per minute. Each irrigation increases drainage in ditches by about 175 gallons per minute, showing that the ditch system is working well and that excess ground water and salt is being removed from fields.

One flume showed more than 400 tons of salt were drained from one main ditch from March to October last year.

Not long ago, Armand said, "We've gotten some surprising results from our drainage work. We worked over 90 acres in 1957, smoothed them up and changed the direction and location of borders. Then in the fall we seeded them to an improved mixture of grasses and legumes. In the spring of 1958 the seeding looked good and we grazed it lightly all last year. The field had a beautiful stand last spring. Drainage made our pastures better producers and we can now grow more and better alfalfa.

"We plan to take 200 acres, or about half of our ranch, out of poor-rough pasture and plant it to asparagus in the spring of 1960. Asparagus wouldn't grow when the land was wet and salty.

"On some of the worst alkali land we drained, grass is coming back with no other treatment."

Borings were made on some of the worst alkali spots in mid-March and no free water was found at 5-foot depths.

The Bankheads aim to treat the rest of their acreage so that it will produce like their top 90.

Two of the Bankhead's neighbors, Bill Ralph and Fred Draper, are now carrying out the same kind of drainage work.

Great Plains Land Ownership

Concentration of ownership of rural land in 10 Great Plains States, containing 47 percent of the farm and ranch land in the U. S., did not change appreciably between 1954-58, a USDA survey shows. Although there were fewer owners and the average size of ownership unit was increased, the proportion of land held by both small and large holders was about the same in 1958 as in 1945.

The proportions of rural land in public and private ownership vary considerably in the 10 States with private ownership averaging 75 percent.

A Special Report on

Progress In Watersheds

For conservation and flood prevention

By CHARLES H. LLOYD

Fiscal year progress reports for Pilot and Public Law 566 Watershed Projects and Flood Prevention Watershed Projects are full of statements that tend to forecast a highly successful future for the watershed programs with which the U. S. Department of Agriculture is helping local organizations and landowners.

Local organizations throughout the country by October 1, 1959, had submitted 1,204 applications for assistance under P. L. 566. The applications covered more than 86 million acres.

Planning help by SCS technicians had been approved for 498 of those applications. Federal assistance in the installation of measures planned for the projects had been approved for 209 small watersheds covering 12,412,000 acres.

Note:—The author is soil conservationist, watershed planning division, Soil Conservation Service, Washington, D. C.

A reviewer of these reports is impressed by many things but most of all by: Actions taken by sponsoring organizations to overcome a variety of problems; the high degree of acceptance of responsibilities by capable local leaders; and, the effectiveness of completed and partially completed projects under severe tests.

The performance and accomplishments of local leaders are so outstanding that it is difficult to select and summarize examples from the reports that will adequately reflect the progress being made in watershed projects.

But the effort has been made. On the following pages are examples that seem to be representative, summarized under four major headings: Easements and Finances; Land Treatment Progress; Structural Measures; and How Well Do They Work?

Snowcapped mountains make beautiful scenery and provide water for many purposes but may also start floods. This is the Collegiate Range above the Arkansas River Valley near Buena Vista, Colo.

Easements And Finances

Many and varied problems are encountered by local sponsoring organizations in providing land easements and rights-of-way and in sharing the cost of structural measures for water management in watershed projects. Action taken to overcome them emphasizes the high quality of local leadership.

Following are examples of how local organizations are handling this phase of the watershed job, as reported in fiscal year summaries. Unless otherwise indicated they are Public Law 566 projects.

Arkansas

Flat Creek, Lawrence County: The Arkansas Game and Fish Commission acquired more than 900 acres required for a multiple-purpose structure at a cost of about $100,000. This structure was scheduled for construction during the first year of the installation period. Easements were complete for a floodwater retarding structure, also scheduled for first year construction. Four additional easements had been signed on other structure sites.

The Arkansas Highway Department was preparing plans to relocate 1.1 miles of Arkansas Highway No. 25 to permit construction of the multiple-purpose structure.

The Flat Creek Watershed Improvement District was created in Chancery Court and the commissioners appointed. This district will levy taxes to raise funds for the local share of installation costs and for operation and maintenance of the works of improvement. The Game and Fish Commission will operate and maintain the multiple-purpose structure and the 4.6 miles of diversion.

Alabama

Hightower Creek, Towns County: Easements and rights-of-way valued at $8,822 had been obtained from 63 landowners. This work was done by a committee composed of E. R. Eller, farmer and Hightower Creek Watershed Association president; Sanford Berrong, farmer and watershed association vice president; H. Jack Eller, farmer and watershed association secretary and treasurer; Bert J. Eller, R. M. Kimsey, R. L. Anderson, J. C. Coleman, and G. C. Rogers, all farmers and watershed association directors.

The easements and rights-of-way cover all structural works of improvement. Local landowners spent an additional $800 in obtaining easements for moving a house and power poles.

Indiana

Elk Creek, Washington County: The Elk Creek Conservancy District was assigned the task of obtaining easements and rights-of-way by the Washington County Soil Conservation District. All easements and rights-of-way for all channel and drainage work were donated.

Only three easements remained to be obtained above two structures. The landowners were willing to grant easements but some question arose as to whether a change in site might be feasible. The conservancy district has the right of eminent domain under State law and the directors said they would use this power if necessary.

Kansas

Switzler Creek, Osage County (Pilot project): Easements had been obtained for three completed structures and for the structure scheduled for construction in fiscal year 1960. The Osage County Soil Conservation District board of supervisors obtained the easements. Additional easements needed for the remaining multiple-use structure were to be obtained by the City of Burlingame.

Louisiana

Bayou Dupont, Natchitoches, and Sabine Parishes: Of 218 easements valued at $158,000 needed for 22 structures, 203 easements had been signed. This work was done by a committee consisting of Marshall Winn, chairman of the sponsoring district; Ott Williams, chairman of the neighboring district; Robert Jackson, former tax assessor; John Luster, businessman, and several local farmers. All easements were cleared on 14 reservoir sites.

Mississippi

Ellison Creek, Yazoo County: The Ellison Creek Watershed Drainage District applied for a Farmers Home Administration loan for $52,000 to cover the

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EDITOR'S NOTE: Annual progress reports on watershed protection and flood prevention projects are used in many ways. They also provide the basis for this roundup story—selected thumbnail sketches of what's going on in a few places across the country. Also see the story about the Washita River project which follows this article. More information about the P. L. 566 program may be obtained in two publications available from your nearest SCS office: "Small Watershed Projects Under the Watershed Protection and Flood Prevention Act" and "Local-State-Federal Watershed Projects."

local share of construction cost, easements and rights-of-way, and administrative costs. All easements and rights-of-way were to be obtained by court decree. The watershed drainage district will pay $150 per acre for land covered by water in the permanent pools of the four structures.

Missouri

Platte River Tributaries, Worth County: Easements and rights-of-way valued at $7,500 had been obtained from 19 landowners. All easements and rights-of-way had been obtained for 12 of the 13 structural measure sites. One easement and right-of-way were to be obtained. This work was done by Carl Hiatt, district chairman; C. R. Streeter, Sheridan banker and watershed trustee; Carl Winemiller, farmer and watershed trustee; Art Scott, farmer and watershed trustee; Luther Cook, implement dealer; and Bob Holland, oil distributor.

North Dakota

Elm River, Traill, Steel, and Cass Counties: Easements had been obtained for one floodway and were being obtained for four others. The Traill County Water Conservation and Flood Control District is responsible for obtaining easements and rights-of-way. It has sufficient money on hand or is able to raise the necessary revenue through taxation to obtain the rights-of-way needed. It has the right of eminent domain and has indicated that it will use it if necessary.

Oklahoma

Big Wewoka Creek, Seminole, Hughes, and Pottawatomie Counties: Seventy percent of all easements and rights-of-way had been obtained from 146 landowners at a value of $429,250. The four principal cities in the two watershed projects, Wewoka, Seminole, Holdenville, and Wetumka, furnished $34,300 to establish and operate the conservancy office until operating funds are obtained from assessments on benefited land.

Seminole and Hughes County Soil Conservation District supervisors had obtained about $7,000 from the Oklahoma State Soil Conservation Board revolving fund, to be used in obtaining easements and rights-of-way at five locations.

Oregon

Lynx Hollow, Lane County: Easements had been acquired along the old Lynx Hollow channel at no cost. Rights-of-way valued at approximately $18 000 (including the outright purchase of one entire property) had been or were to be acquired by the Creswell Water Control District along the proposed diversion channel.

South Carolina

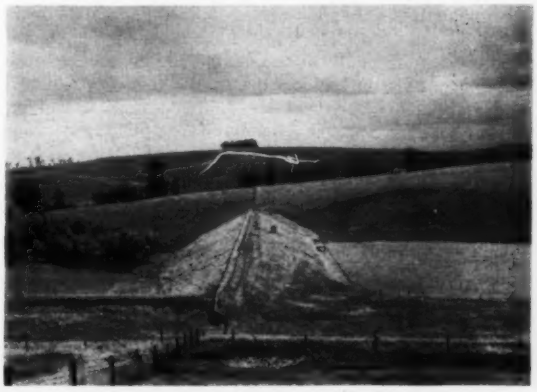
Brushy Creek, Anderson and Pickins Counties: Easements and rights-of-way are valued at $29,451. Of the 43 easements and rights-of-way needed for the 4 floodwater retarding structures, 30 have been obtained. This work was done largely by District Supervisor R. T. Tripp assisted by the Brushy Creek Watershed Board of Directors and other farmers within the watershed.

Tennessee

Jennings Creek, Jackson, Macon, and Clay Counties: Funds for the acquisition of easements and rights-of-way will be raised by assessment on the flood plain land benefited by the structural measures. Procedures under the Tennessee Watershed District Act, as a step in making assessments, were started. Application for a loan was made to the Farmers Home Administration. It was estimated that easements and rights-of-way for the five structures planned for construction in fiscal year 1960 would be available by February 1960.

Common Bermudagrass cover prevents erosion on earth dam in Green Creek Pilot Watershed Project, Earth County, Texas.

Detention dam helps prevent floods and provides fishing, stockwater, and waterfowl habitat, Scott Creek Pilot Watershed, Union County, S. Dak.



Land Treatment Progress

The more rapid application of conservation measures by individual landowners and operators reflects the determined efforts of sponsoring local organizations to keep land treatment work ahead of construction in watershed projects. The successful ones enlist all available help from every possible source. Their efforts are positive and productive. Following are examples of progress in land treatment taken from the fiscal year summaries. Unless otherwise indicated, they are Public Law 566 projects.

Kansas

Little Delaware Mission Creek, Brown County (Pilot project): Over 70 percent of the needed land treatment measures were applied. Estimated total cost of all needed treatment measures is $362,200. Basic conservation farm plans were completed on 92 percent of the farms.

Conservation treatment was completed on 22 percent of the farms. Of the needed 690 miles of terraces, 410 miles were constructed, and of the needed 1,000 acres of waterways, 850 were established.

Alabama

High Pine Creek, Chambers and Randolph Counties: Of the 385 farmers in the watershed, 213 were cooperators of the Piedmont Soil Conservation District. Of the cooperatives, 181 had basic conservation plans. On the 2 construction units approved, more than 60 percent of the land was under agreement and about 75 percent of the planned practices applied. On the third construction unit, 40 percent was under plan and 60 percent of the planned practices applied.

Arkansas

Caney Creek, Cross County: Installation of land treatment measures, estimated to cost $237,000, was ahead of schedule. Of the 256 farmers in the watershed, 187 were soil conservation district cooperators. Sixty-five percent had basic conservation farm plans. More than 50 percent of the planned land treatment measures were applied. All land treatment measures were completed on 31 farms totaling 2,740 acres.

The Forest Service and the Arkansas Forestry Commission supervised the planting of 175 acres of pine seedlings for watershed protection and 18 acres of seedlings for critical area stabilization.

Indiana

Elk Creek, Washington County: Slightly less than half of the landowners were soil conservation district cooperators, but 58 percent of the land was under district agreements. Many tracts of 20 to 40 acres of timbered land are owned by absentee landlords, several outside the State. Since these lands are not grazed and the timber not harvested, they do not represent a hazard.

Of the 387 acres of contouring planned, 322 acres were applied; of the 5 miles of terracing planned, 4.3 miles were constructed; of the 630 acres of pasture establishment planned, 246 acres were applied. The estimated cost of land treatment measures is $145,931.

Kentucky

Cypress Creek, Union County: Application of land treatment measures was ahead of schedule. Of the 185 farmers in the watershed, 163 were soil conservation district cooperators, and 122 of them had basic conservation farm plans. Conservation practices were established by 123 district cooperators during the year.

The practices included: 1,647 acres of conservation cropping systems; 1,071 acres of cover crops; 1,605 acres under crop residue management; 585 acres of pasture planting; 538 acres of pasture improvement; 247 rods of multiflora rose fence; 49 acres of wildlife area treatment; 1.4 miles of diversion channel; 29 acres of waterway development; 16,112 linear feet of channel improvement; 84,242 feet of tile drain; and 54 acres of gullied areas stabilized.

Approximately 65 percent of the needed land treatment measures were applied in the watershed.

Maryland

Little Deer Creek, Hartford County: More than 75 percent of the planned land treatment measures were applied. Of the 93 farmers in the watershed, 58 were district cooperators and 44 had basic conservation farm plans. About 60 percent of the conservation measures needed on cropland were established. About 70 percent of the measures required on grasslands were established. Of the woodland measures, 60 percent of the tree planting and 86 percent of the woodland protection were completed.

To interest farmers in woodland management, the State's district forester established four demonstration plots of 1 acre each in the watershed. A pipeline area crossing the watershed was improved for wildlife by seeding Korean and sericea lespedeza where clearing was done through woodland.

Nevada

Peavine Mountain, Washoe County: The planned land treatment measures were being applied on schedule. By

agreement with the landowners, the City of Reno assumed the responsibility for the land treatment work on privately owned land. Reno has an agreement with the Bureau of Land Management for the bureau to establish the land treatment measures on the privately owned land in addition to doing the work on Federal land.

Brush eradication was completed on approximately 1,100 acres. A contractor was constructing 8.5 miles of fence around the watershed. An additional 3-mile section of fence will be constructed later. The estimated cost of all land treatment is $34,200.

North Dakota

Elm River Watershed, Traill, Steele, and Cass Counties: More than 60 percent of the farmers in the watershed were soil conservation district cooperators. Of the 608 farms, 154 had basic conservation farm plans covering 80,000 acres. Soil surveys were completed on 2,560 acres this year. Of the 388 acres of trees needed in field shelterbelts, 186 acres were planted this year. Of the 312,000 cubic yards of earth moving needed to improve individual water disposal systems, 50,000 cubic yards were moved in fiscal year 1959. Other practices applied include 22,335 acres of conservation crop rotations, 7,800 acres of cover cropping, and 300 acres of wind stripcropping.

Land treatment in the project area was given highest priority by the soil conservation districts. A conservation planner was assigned to the project this year to speed up the land treatment program. The total cost of the land treatment is estimated at $525,000.

South Dakota

Scott Creek, Union County, (Pilot project): Approximately 70 percent of the land treatment measures had been applied. Of the 24 farmers in the project, all but one were soil conservation district cooperators and had basic conservation farm plans. Conservation treatment was completed on 12 farms, containing 751 acres.

Of the 45 miles of terraces needed, 19.5 miles had been completed. Estimated cost of land treatment is $87,545. ACP cost sharing assisted in this phase of work.

Structural Measures

The structural measures in watershed projects are generally dependent on the land treatment measures for protection. Their effectiveness, operation, and maintenance are in a large measure directly related to the protection given the land in the watershed by conservation land treatment measures. Structural measures therefore generally follow land treatment. Progress in installing structural measures is thus mostly in projects that have been underway for the longest time. Following are examples of progress in installing structural measures from the fiscal year summaries.

West Virginia

Salem Fork of Ten Mile Creek, Harrison County (Pilot project): Seven floodwater retarding structures, one municipal reservoir (combination city water and flood control), and 2½ miles of channel improvement had been constructed. These measures costing about $280,000 have a benefit-cost ratio of 1.5 to 1. The City of Salem paid the entire cost of the municipal reservoir.

Illinois

Old Tom Creek, Warren and Henderson Counties (Pilot project): Thirty-nine floodwater and stabilizing structures and 2.6 miles of waterway improvement had been completed. The Warren County Highway Department provided part of the funds for the installation of a dual purpose structure to serve as a floodwater retarding structure and county roadway, replacing a bridge.

Georgia

Little Tallapoosa River, Carroll and Haralson Counties (PL 566): Contracts had been let for 5 of the 14 floodwater retarding structures. These were in various stages of construction, from just starting, clearing and grubbing, to laying the pipe and concrete work. One additional structure was advertised for bids, and specifications were prepared for channel work below 5 structures. Contracts awarded were for less than government estimates. The Town of Temple, cosponsor of the project, will pay $3,961 for municipal water storage included in one floodwater retarding structure.

Nebraska

Brownell Creek, Otoe County (Pilot): Seven of the planned 9 floodwater retarding structures, 28 of the planned 39 stabilizing and sediment control structures, and two appurtenances to existing structures had been completed or were near completion. The total contract cost to date was $220,890. Contracts were to be let for two additional floodwater retarding and 6 stabilizing and sediment control structures this fall, so that construction may be completed well before next June 30, the termination date of the installation period.

Five planned stabilizing and sediment control structures will not be installed because of unavailability of easements or lack of essential land treatment. Easements are available for all of the structures that will be contracted during this fiscal year. Estimated construction cost for the complete structural program is $549,000.

Texas

Trinity River, Northeastern (Flood Prevention Act of 1944): Completed, under construction, or under contract were 234 floodwater retarding structures. Of these, 49 were constructed during the 1959 fiscal year. Fifty-four floodwater retarding structures and 14 miles of channel improvement were scheduled for construction during the 1960 fiscal year.

Escondido Creek, Karnes County (Pilot): All 11 of the planned floodwater retarding structures had been installed. Final Federal cost exceeded original work plan estimates by about 5 percent. Modification in design of some structures prior to construction and procedural changes in determining cost estimates contributed to the differences.

Oklahoma

Little Wewoka-Graves Creek, Hughes, Seminole, Okfuskee Counties (PL 566): Of the 18 floodwater retarding structures planned, 5 had been built at a Federal cost of $155,566, about 8 percent less than the work plan estimates. Contracts had been let on two additional structures in the amount of $81,522. About 75 percent were complete. Bids were to be opened early this fiscal year on two additional sites, with an estimated Federal cost of $111,970. Total estimated Federal cost of all floodwater retarding structures is $712,598.

Combination of practices holds soil above detention dam, East Willow Creek watershed, Fillmore County, Minn.

Tennessee

Wolf River Tributaries, Marry's and Sand Creeks, Shelby and Fayette Counties (Pilot): Of the 12 floodwater retarding structures planned, 5 had been completed at a Federal cost of $121,000. Contract had been let for one additional structure to cost $15,000, about 3 percent more than the estimate. It was about 10 percent complete. One of the structures is multipurpose, including storage for irrigation and recreation.

Utah

Green's Lake, Iron County (PL 566): All of the structures including two debris basins, three floodwater dams, and one floodwater diversion channel had been completed under one contract at a Federal cost of $188,935. In addition, a second contract was completed at a Federal cost of $3,940 for 25 acres of seeding of the dikes and earthen embankments on the above structures, 3½ acres of mulching, and 1¾ miles of fencing to protect the seeding.

West Virginia

Daves Fork-Christian's Fork, Mercer County (PL 566): All three of the planned floodwater retarding structures had been constructed at a contract cost of $87,000, about 2 percent under work plan estimates. Planned for installation in fiscal year 1960 were 66,000 feet of channel improvement. The State Road Commission installed a major highway culvert on U. S. Route 219 to conform to line and grade of the proposed channel job. The channel work will integrate with similar work on Brush Creek to be built by the U. S. Corps of Engineers.

Well vegetated emergency spillway is part of flood water retarding structure on a Nebraska farm.

How Well Do They Work?

The effectiveness of a watershed protection project depends on the stage of the installation of the planned land treatment and structural measures. The more advanced the installation of these measures is, the more effectively the project may be expected to perform when tested by severe storms. A number of projects that are well along toward completion have not yet been subjected to sufficiently severe storms to adequately test their effectiveness. Other have received severe tests during construction.

As may be expected the most notable examples in the performance of projects under storms are in the older ones. Many of those are pilot projects. The following examples are from the fiscal year summaries.

Delaware

Bear Hole, Sussex County (PL 566): The Bear Hole Project in Delaware was finished in March 1959. Four months later a rainstorm hit the area with an intensity expected only once every half century. People who have lived there longer than that said they had never seen such a downpour. Thirteen inches of rain fell in 6 days, July 10 to 15, after the earth had been saturated.

The crop growing season was at its peak, but Bear Hole Watershed handled the deluge with an estimated crop damage of only $2,000. Farmers in unprotected areas figured damages five times as great. The second day after the rain stopped, Bear Hole Watershed farmers were out in the fields on their tractors. In wholly unprotected areas, farmers were still unable to get into their fields after 2 weeks.

Arkansas

Six Mile Creek, Logan and Franklin Counties (Pilot): Following a heavy rainstorm in April 1957, the works of improvement installed at that time (structural measures 90 percent complete) reduced the flood damage 50 percent. Had a completed program been in place, the reduction in damages would have been an estimated 77 percent.

Clyde Hiatt, chairman of the Franklin County Soil Conservation District board of supervisors, said that after a period of heavy and continued rainfall, the greatest since 1902, the Six Mile Creek Project performed according to expectations.

Henry Gray, a landowner in the lower flood plain, experienced some flooding for less than 24 hours following the April storm. He said that this was the only time the Six Mile Creek overflowed his land that spring. Without the project his farm would have been flooded at least 12 times when the Arkansas River remained at flood stage 55 days.

Iowa

Honey Creek, Lucas County (Pilot): The evening of July 1, 1958, rainfall ranging from 3 inches to 4.7 inches fell in parts of the watershed. Some overflow at the lower end caused slight damage. The soil was dry prior to the rain. The overflow could have been prevented by creek channel improvement and removal of willows and other trees.

The first 5 months of 1959 were the wettest on record in the vicinity of Honey Creek. About 22 inches of snowmelt and rain were received by the end of May.

In May, rain occurred on 19 of the 31 days. On May 30, following a 3-day rainy period, more than 5 inches of water fell over the upper two-thirds of the watershed and 4.25 inches fell over the lower end. Recording gages showed that about 2 inches of this rain fell between 7:30 and 8:20 p.m. and the remainder by midnight. This was probably the worst flood-producing situation of record here, exceeding that of June 1947. The project stood the test.

Nebraska

Indian Creek, Gage County (Pilot): Until spring of 1959 there had been no storms within the watershed that tested the effectiveness of the program. Several storms with sufficient precipitation to fill the floodwater retarding reservoirs above the primary spillways

Fisherman on detention reservoir, Sandstone Creek, reaps one benefit of watershed protection.

had occurred but none that required use of the emergency spillway.

Last spring a 6- to 8-inch rain of short duration fell in the northern part of the watershed. It filled the floodwater retarding reservoirs and some flow went through the emergency spillways. All reservoirs in which this occurred functioned satisfactorily and without damage to the spillways or structures. Moderate to severe flooding on flood plain lands within the watershed were prevented on several occasions during recent years because of the effectiveness of the floodwater retarding structures and applied land treatment practices.

A high degree of land treatment has been applied, including terraces and grassed waterways, crop rotations, grass and legume seeding for hay and pasture, small stockwater ponds, and erosion control structures.

The numerous stabilizing and sediment control structures installed have been effective in retarding channel erosion and in providing base grade points for smaller erosion control structures and terraces system outlets. Substantial reductions have been made in reservoir sediment deposition and detention storage requirements because of the water held back by land treatment.

New Mexico

Hatch Valley Arroyos, Sierra and Dona Anna Counties (PL 566): All structures received flood runoff immediately after or during construction. No damage from floodwater or sediment occurred on the protected areas. Damages on adjacent unprotected farmland amounted to thousands of dollars.

Site 6 (Garfield) was completed in August 1957. While under construction it received flood runoff from 3 small and 2 moderate-sized storms. The structure prevented severe damage from flood runoff during these storms.

Site 5 (Rodey) was completed in July 1958. The structure controlled flood runoff from 3 storms the first summer. Rainfall for each storm was estimated at 2 to 3 inches. Approximately 50 percent of the storage capacity was used to control the floods. Without the structure it is estimated that damage would have amounted to approximately $8,500 in crop loss plus $3,000 damage to farmsteads and irrigation facilities.

South Carolina

Twelve Mile Creek, Pickens County (Pilot): As a result of channel improvement work and the construction of a floodwater retarding structure, the usable area along Rice's Creek had increased an average of 20 percent. Each year since works of improvement began, landowners are using flood plain land more intensively. The crops include watermelon, corn, small grains, and improved pastures.

"We are able to use this floodplain land more intensively," Robert S. O'Dell said, "because of the floodwater retarding dam built up the valley and the stream channel improvement work done along Rice's Creek. It has reduced the frequency of flooding to the extent we are not worried about the risk."

State highway and county road officials continued to reduce the capacity of drainage culverts and bridges as they were replaced on roads immediately downstream from floodwater retarding structures.

Texas

Sulphur Creek, Lampasas and Burnet Counties (PL 566): During the latter part of June 1959, torrential rains in and near the Sulphur Creek Watershed, measuring up to 8.5 inches at Nix, 14 miles west of Lampasas, failed to produce flooding along the stream in the vicinity of Lampasas. This storm came when three floodwater retarding structures were installed, one approximately 25 percent completed and another about 15 percent finished. Reduction in floodwater damage because of installed measures was estimated at approximately $5,000.

Washington

Saar Creek, Whatcom County (PL 566): When construction was started in 1958, the driest summer on record occurred. Saar Creek dried up. Unusually damaging and frequent storms occurred during the winter of 1958-59. That part of Saar Creek where construction was completed performed as planned. That part of the channel where construction was to be done in the spring of 1959 overflowed its banks and all adjoining land was flooded.

Taming the Washita

Local people have subdued parts of an unruly river and remaining job moves ahead rapidly.

By RAY WALKER

The Washita River Watershed consists of 7,871 square miles and is divided into 64 subwatersheds for work plan development, local participation, and operation. The primary problems are erosion on upland and frequent flooding of 265,000 acres of bottomland along the tributaries and 112,000 acres on the main stem of the Washita River.

Local cooperating agencies such as watershed associations and soil conservation districts promote the activities in each watershed. Guidance is furnished in priorities of work by overall leadership in the watersheds through the Washita Flood Prevention Council. The council is made up of members of the board of supervisors of each soil conservation district and the officers and directors of the watershed associations concerned.

Land treatment accomplishment has been outstanding over much of the Washita watershed. In the Upper Washita Soil Conservation District some 22,325 acres of range seeding was done this year. This makes 87,013 acres now on the land in the district. Other accomplishments included 200 stock ponds, 322 miles of terracing, 60,773 acres of range properly used, 150 waterways, 17,906 acres of cover cropping —all in the Upper Washita district. Other districts reported similar accomplishments.

Installation of the practices reflects the determined efforts of local people to keep the land treatment phase of watershed work ahead of construction. The district governing bodies are giving excellent service in this phase. An ample number of grass seed drills were made available to cooperators to get the range seeding job done. High-quality seed stock is kept in abundant supply by the various governing bodies. Bermuda spriggers, fertilizer spreaders, brush cutters, land levelers, and other conservation equipment are easily available to the cooperators from the districts.

The ASC committees in the various counties have placed added emphasis on the watershed treatment program and their efforts have materially helped get conservation on the land.

An effective gully control program was installed during the year on several watersheds.

Note:—The author is State conservationist, Soil Conservation Service, Stillwater, Okla.

County road crossing detention dam eliminates cost of bridge and road damage, Barnitz Creek watershed.

In 20 years, flood sediment half covered this 50-year-old house in Roger Mills County, Okla.

Silt-contributing gullies were treated by sloping the sides and grassing the disturbed areas to Bermudagrass, native grass, or King Ranch bluestem. This has resulted in a great reduction of soil loss, increased the infiltration rate of the rainfall into the soil, and materially reduced the siltation on bottomlands downstream.

Approximately 65 percent of the Washita River watershed drainage area is under farm conservation plan and agreement with local soil conservation districts. All watersheds having structural measures installed have at least 75 percent of the planned practices applied on land which is considered to be a large silt-contributing source.

Construction progressed on 106 structures in 15 watersheds in fiscal year 1959. Nine Mile, Panther, and Cobb Creeks were completed. All the structures on Broken Leg, Dead Indian-Wildhorse, and Fast Runner were under construction. The remaining sites on Cavalry and Saddle Mountain Creeks were being built.

Five watershed work plans were approved by the sponsoring agencies in fiscal year 1959. The Upper Washita subwatershed, which has a total area in Oklahoma and Texas of 471,730 acres, was presented to the various sponsoring agencies in June. All easements and rights-of-way had been cleared on the 24 flood detention sites on the Oklahoma side.

District supervisors took the leadership and within a period of 2 months all easements were in hand. The sponsoring agency allocated some $2,000 to move wells and houses. The county commissioners will rebuild and relocate roads in seven of the sites.

Easements were being obtained by the soil conservation district supervisors, members of the watershed associations, and other interested parties from property owners on 12 subwatersheds. The Criner Creek Flood Prevention Association is an outstanding example of local interest and accomplishments. Money was raised by this group from voluntary and popular subscription to pay for hard-to-get easements. In one night more than $2,000 was raised among the board of directors.

Turkey Creek subwatershed plan was presented to sponsors in July. All easements on the 12 sites on this watershed were cleared. The City of Clinton, Okla., contributed $16,000 and the sponsoring agencies $2,000 to clear hardship easements on the three detention structures above the Clinton water supply.

EDITOR'S NOTE: Here is more detail on one flood prevention activity. This story is a summary of the annual year-end progress report of the Washita project and supplements the preceding "Special Report" on watersheds. Work in the Washita has been under way longer than most others, having been started under the Flood Control Act of 1944. For more background, dating back to the 1920's, see "The Washita Story" in SOIL CONSERVATION Magazine, July 1957.

Sugar Creek was presented to the sponsoring agencies in April. The easement drive was progressing nicely with 20 percent of the easements for the 43 floodwater retarding structures in hand.

State agencies, such as the State Soil Conservation Board, Board of County Commissioners, State Highway Commissioners, and others are participating in developing work plans and cooperating in the installation of land treatment and structural measures. The Oklahoma State Legislature provided $145,000 in revolving funds to provide land through condemnation proceedings and to dispose of surplus undeeded land. This money is used over and over to acquire additional property.

Boards of county commissioners are cooperating in relocating roads, moving bridges, and otherwise adjusting county road systems to conform to watershed work plans.

One such job in the Peavine Creek watershed meant raising ⅝ of a mile of county roadbed as much as 10 feet. Six pieces of heavy equipment were used at one time to speed up the work.

Mulch spreader applies a ton per acre after seedbed preparation on new dam.

Federal agencies, in addition to the Soil Conservation Service, are cooperating. The Extension Service is assisting with the educational phase of the program. The Bureau of Indian Affairs, in addition to assisting in the preparation of work plans, has been instrumental in securing easements from restricted Indian landowners. The bureau also has assisted and encouraged land treatment measures on the farms under its jurisdiction.

The stabilization and conservation programs have helped farmers financially in carrying out various soil conservation measures necessary for proper land treatment. The Farmers Home Administration assisted certain farmers financially in carrying out intensive soil conservation programs. The vocational-agricultural departments in the various high schools gave assistance along the same line.

The completed Mill Creek watershed in Murray County, Okla., is an example of benefits from an upstream flood prevention program. After 18 floodwater retarding structures were completely installed, more than 500 acres of cropland, formerly subject to overflow, were placed under irrigation. These acres were leveled immediately below four retarding structures and placed under irrigation, using water from two irrigation wells with 4,500 gallons per minute capacity.

To condition the land for high value crops, such as alfalfa, the area was planted to rye and hairy vetch the first year. This allowed the newly placed soil in the leveled areas to settle before alfalfa was seeded. Alfalfa production was 4 tons per acre up to July 1. Yields of 8 tons per acre are anticipated in 1960.

Automatic sprigging machine sets common Bermudagrass roots on slope of new dam.

On May 25 and 26, 1959, flood producing rains occurred on a number of watersheds in the Washita. Panther, Kiowa, and Whiteshield Creeks received rains of from 6 to 10.5 inches over a 9-hour period, with intensities reaching 1.27 inches in 7 minutes. Two sites on Panther discharged through the emergency spillways. Site No. 1, Kiowa Creek, had a small amount of flow through the emergency spillway. Flood producing rains occurred on Sandstone, Beaver Dam, Sergeant Major, Nine Mile, and Barnitz during the same period. Some flooding occurred on Sandstone, Panther, and Barnitz but farmers and ranchers were enthusiastic in their praise of the flood prevention program on the treated watersheds.

W. S. Haitt of Hammon, reported that the structures on Kiowa Creek prevented the total loss of 100 acres of his wheat. He harvested 37 bushels an acre. Mr. Peterson on Panther Creek gave two structures credit for preventing complete destruction of 60 acres of bottom land.

Not one acre of wheat was lost on Barnitz Creek due to flooding. Nine Mile and Kiowa Creek overflowed less than 50 acres. Beaver Dam and Sergeant Major Creek never left their channels. Flood on Sandstone did very little damage to wheat. Watersheds such as Whiteshield and Beaver Creek, where only two small structures are in place, had untold damage. The entire flood plain was covered, crop damage was high, and six bridges were lost on Whiteshield alone.

Some people familiar with the flood of 1934 believe that a greater amount of water fell during the May 25–26 rains than on April 3, 1934. They gave credit to the treated watershed, the excellent vegetative cover on the rangeland, and the great amount of land treatment on the cultivated land for preventing even greater damage than in 1934.

Many multiple purpose projects have resulted in great benefits to municipalities and individual landowners. The City of Marlow, Okla., is cooperating and participating in the cost of Rush Creek Site No. 1 at the head of Rush Creek watershed. This will impound 2,000 acre-feet of water for the City of Marlow, in addition to the 4,000 acre-feet of flood storage planned in the original program from a drainage area of 13,000 acres. The City of Duncan voted a $500,000 bond issue to participate in the con-

struction of Wildhorse Creek Site No. 39 wherein 30,000 acre-feet of water will be stored and impounded or detained from a drainage area of 24,000 acres. Easements and purchases are being acquired by the two municipalities for the construction of the two reservoirs.

Stream channel stabilization measures were being carried on by interested landowners at their own expense on the flood plain below the floodwater retarding structures. Previous to the works and measures being installed, floodwater damage and erosion had made it impractical to carry on work of this kind. Areas formerly covered with trees, shrubs, and perennial weeds on bottom land are being cleared and the land returned to improved grasses and legumes for the production of high forage crops for livestock.

Need for good forage and land protection bring

Better Grass on the Range

Progress in range seeding is illustrated by accomplishments of the Twin Falls Soil Conservation District in southern Idaho last fiscal year. When the district was organized in 1951, poor condition of much of the range offered vast opportunities for improvement. At that time, practically no attempts had been made at range improvement through reseeding.

Today, 129 ranchers have made range seedings a part of their conservation ranch program and have well over 100,000 acres of successful seeding. This practice alone has increased forage production from 5 to 20 times on some ranches. Ranchers in the district have contributed from 20 to 50 percent of the cost of seeding an even larger acreage of Federal range lands which they use under lease or permit.

In addition to increased forage and better soil protection, some ranchers materially added to their income last year through the sale of more than 200,000 pounds of grass and legume seed for range seedings in southern Idaho and neighboring states.

With an additional 27,000 acres of seeding planned this year, the landscape in the Twin Falls Soil Conservation District is changing rapidly from sagebrush to grass.

Throughout the West, development of better tillage and seeding equipment has helped get better grass.

In several soil conservation districts of southwestern Kansas extensive areas of rangeland had been reduced to sand, sagebrush, and weeds. The deep, coarse sands were a major source of wind erosion because of the absence of adequate plant cover. Plowing to prepare a seedbed for range seeding merely made matters worse and seeding directly into the existing cover was not successful because of competition from established plants.

Under these conditions it became obvious that special equipment and seeding methods would have to be devised. Equipment developed for this purpose includes a tool bar on which two lister-type shovels and individual seed hoppers are mounted. The shovels clear foot-wide strips of the existing vegetation and the seed is dropped in furrows 2 inches deep 42 inches apart. The tool bar is hinged to permit its use on rolling terrain.

Use of this equipment reduces competition sufficiently to permit the new grass seedlings to become established without increasing the wind erosion hazard.

During the past 2 years more than 100,000 acres of depleted sandy rangeland in southwestern Kansas have been successfully seeded in this manner, most of it to native grasses.

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ADVANCING EDUCATION IN THE GREAT PLAINS PROGRAM, published by Colorado Agricultural Extension Service, is a report of recent meeting of representatives of Extension Service, Soil Conservation Service, soil conservation districts, and others to evaluate progress and plan further educational work.

CUTTING THE CORNERS

By GLEN E. MURRAY

"IN the dairy business today, you've got to cut every corner possible to make a living. I'm operating a first-class grade A dairy, but I'm getting a grade A price for less than half of my milk, so you can see why I am concerned with economy of operation." This was one of the points brought up by Mac Fitzgerald, a dairyman of Draper, Utah, as he talked about how he uses and manages his irrigated pasture.

Mr. Fitzgerald milks 40 head of purebred Guernsey cows which average 4.7 percent butterfat. These cows are on 12 acres of pasture for 5 months each year. The pasture is carrying around 3.5 cows per acre for the grazing season. This pasturage is supplemented with 15 pounds of corn silage and 1 pound of grain for each 5 pounds of butterfat for each cow.

Note:—The author is work unit conservationist, Soil Conservation Service, Murray, Utah.

Mr. Fitzgerald's 12-acre pasture is divided into five feeding plots to facilitate grazing management. Each plot is grazed 4 to 8 days, depending on the season and growing conditions. Immediately after grazing, the plots are harrowed to scatter the droppings, and after every other grazing the plots are clipped to reduce weed seeding and to increase palatability of the forage. Irrigation water is applied and the pastures are allowed to grow for 16 to 23 days before being grazed again. Irrigation water is applied by the border method on leveled land.

The pasture originally was seeded 8 years ago to a mixture of smooth brome, tall meadow oatgrass, orchardgrass, ladino clover, and red clover. The smooth brome, orchardgrass, and the clovers are still doing the job intended, with the tall oatgrass going out after 2 years of

Mac Fitzgerald and his granddaughter Karen in one of the improved pastures with farmstead windbreak in the background.

grazing. But an infestation of strawberry clover is now causing some concern due to the fact that it crowds the better producing clovers out, and volume-wise is a low producer. Mr. Fitzgerald thinks that the area will have to be reseeded soon to restore the high-producing clovers.

Mr. Fitzgerald has been a cooperator with the West Salt Lake Soil Conservation District for 15 years, and he has been the leader in the field of pasture management in this area. Shortly after becoming a cooperator with the district, he developed a conservation plan with the help of Soil Conservation Service technicians. He has followed his plan explicitly and production has even exceeded expectations. In one instance, the plan stated that the pasture planting should result in a carrying capacity of 2 or 3 cows per acre, yet today the capacity is around 3½ cows per acre.

To look at the Fitzgerald farm, it is easy to read the story of conservation farming. Tile drains have been installed to facilitate cropping the land. The irrigation system is efficiently operated and maintained. Underground pipelines, open concrete ditches, and control structures deliver water to leveled land, which has been cropped and managed properly. Windbreaks protect and beautify some of the nicest looking farm buildings seen anywhere.

Registered Guernseys on a rotation pasture on the Mac Fitzgerald dairy farm.

"It's not all done yet," says Mac of his improvements. "I've still got a field or two that needs a little leveling and have a few more improvements to make in my irrigation system, then I still want to do some more fertility management on the pasture area." So, although the improvements have been great, there are still more to come.

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Conservation Leaders Face Challenge

Despite the rapidly growing technical complexity of today's living, there is a growing appreciation of the role of natural resources, D. A. Williams, SCS Administrator, told State conservationists at their annual meeting in September. Thinking people in all walks of life are rapidly coming to realize that most of the great developments of our time could ultimately be meaningless if we do not maintain our resource base.

At the same time, we face a special challenge. Because "conservation" is a good word, and one in the public domain, it has been adopted by many different kinds of programs and movements. We have no patent on the term, so it becomes especially important for us to define our words—to help others to understand that it isn't enough merely to be "for conservation."

True conservation of soil and water resources may well be at the crossroads in officialdom as well as with the public unless the fundamentals are recognized and made widely known.

We may well see a decline in conservation interest unless those who know and care stand fast with integrity to these fundamentals.

The only way to insure proper understanding of the fundamentals and primary urgency of soil and water conservation is to meet directly with leaders, take them to the land, and provide them with meaningful, helpful materials that put the many types of "conservation" in their proper perspective.

Leadership geared to the rapidly and constantly changing world around us—is an essential requirement in the soil and water conservation program today.

FOOD: The Yearbook Of Agriculture. 736 pp. Illus. 1959. Washington, D. C.: U. S. Government Printing Office. $2.25.

For browsing or for specific information, for a recipe, for menus, or for the structural formula of a monosaturated fat, FOOD is an excellent addition to a long series of successful Yearbooks.

The book is divided into eleven parts: Backgrounds, The Nutrients, Health, Allowances, Our Needs, Quality, Preparation, Costs, Trends, Learning and Programs. The 66 chapters are by experts in every phase of food research, teaching, and processing. Several chapters contain material of historical interest to the layman: The Story of Nutrition, The Nutriture of People, and The Pure Food Law.

The nutrients in foods are discussed by a distinguished group of research workers, yet the style of presentation is such that the interested layman will enjoy reading any of these chapters. The limited number of technical terms used are clearly defined in a glossary. An occasional fault may be oversimplification—such as the presentation of a structural formula with the statement "The acid group looks like this:"

The tables of recommended daily dietary allowances and of nutrients in common foods in terms of household management are as complete as current data permit and should be in the hands of every dietition. Vitamin A value, thiamine, riboflavin, niacin, and ascorbic acid values as well as the common minerals and protein and energy components are included for 418 foods.

Food quality and the production of both meat and vegetables of high nutritional and marketable quality are given the recognition their importance demands. The measures taken to ensure clean wholesome foods of perishable nature are described. The meaning of grades for meat, dairy, fish and poultry products is discussed. The factors of taste and prejudice that influence the choice of food and measures of quality are presented.

But the real problem to the housewife—the selection of a tender piece of meat or of a melon or sweet potato of good flavor or texture—has not yet been answered. Many reasons are advanced to explain the poor quality of some of the fruits and vegetables reaching the market, but the outlook for marked improvement under our complicated system of food distribution appears dim.

The practical hints to the housewife on such subjects as food costs, dietary recommendations for children, food preparation, and graded foods are only a few examples of the value of this book to the home. Freezing, canning, and storage with particular emphasis on conserving nutritive value are treated. Some of the basic reasons for success or failure in cooking are discussed in the chapter "When You Cook."

FOOD should have a wide audience among teachers and research workers in agriculture, food technology, and distribution as well as physicians, dentists, and dietitions.

—KENNETH C. BENSON

SNOW SURVEYORS: Defenders Against Flood And Drought. By C. B. Colby. 48 pp. 1959. Coward-McCann, Inc.: New York. $2.

"A very attractive book," is the first reaction one gets of this 48 page beautifully illustrated "picture book" about snow surveyors.

To those who enjoy winter's out-of-door splendors, this book, with its large collection of beautiful snow scenes, taken in the high mountain areas of the West, will add enjoyment.

For others, who want to know more about the hazardous life of these "snowflake men" the author effectively portrays their work as they go by skis, snowshoes, or over-snow machines to the higher mountains to measure the snow.

To the practical minded soil and water conservationist this story gives the purpose and importance of snow surveys. Colby explains how the hardy snow surveyor goes many times during the winter months to measure snow so the amount of available water can be accurately forecast. About 1,000 men make at least one trip each winter to one of the 1,300 snow courses. The "snowflake men" often face blizzards and hazardous hardships to carry out this worthwhile mission.

If the forecast shows more water than usual

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the reservoirs in the rivers below can be lowered, dikes constructed, and other precautions taken to prevent damaging floods.

If the snow measurements show there will be a shortage of water; farmers, conservationists, power companies, etc., can adjust their plans to take care of the shortage.

You will find Colby's "Snow Surveyors—Defenders Against Flood and Drought" fascinating reading.

—FAIR C. GRIFFIN

Dam saves tax money

When Mrs. Alberta Klein, Brown County, Kans., needed a new grade stabilization structure on her farm she worked out an agreement with the county government to share costs and build a larger dam farther downstream where a new bridge was needed. SCS technicians in the local soil conservation district gave technical help.

Mrs. Klein got her dam at no increased cost, gave up no land for the site, and stabilized a larger area of land. The county put the road across the dam and saved $5,045 of tax money.

Six other similar agreements in Brown County have given farmers either grade stabilization structures or stock water ponds. ACP "cost sharing" helped with the financing.

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Many districts have printed or mimeographed "drive-it-yourself" tour guides so visitors can find and see conservation without a conducted tour.

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Number of farmers using irrigation in the eastern United States continues to increase.

Cooperation brings erosion control and good land use

The Ukiah Lumber Co., a cooperator of the Walla Walla Soil Conservation District in Washington, obtained Soil Conservation Service technical assistance from the district in making a soil survey of a 700-acre tract of steep and badly eroded cropland. The survey determined the capability of the land for tree planting, indicating which areas were suited to ponderosa pine.

The State Department of Forestry then provided seedling pines, planting machines were furnished by the State Extension Service, and technical assistance in both planning and planting were coordinated by the district among all agencies concerned. Through this cooperative effort a 700-acre tract was planted to trees adapted to the site, erosion control will be achieved, and a profitable crop later on is assured.

Walla Walla experience is one example of cooperation among local, State, and Federal agencies and organizations of farmers or ranchers in profitable use of trees for erosion control and as the best use of certain kinds of land.

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By summer of 1959 more than 600 million acres had been soil surveyed in sufficient detail for conservation planning of farms, ranches, and watersheds. This is about half the agriculture land in soil conservation districts or 30 percent of the total land area of the United States.

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When the national inventory of conservation needs is completed in 1960 it will provide reliable data on the size of the soil and water conservation job, including small watershed project needs. Facts are now being compiled on a county and state basis.